Oef 1 (22)

$$\int \underset{g'(x)}{\underset{\parallel}{x^2}}\ \underset{f(x)}{\underset{\parallel}{\ln x}}\,dx$$

$$g'(x) = x^2 \Rightarrow g(x) = \frac{x^3}{3}$$

$$= \frac{1}{3}\int \ln x \; d\, x^3$$

$$\overset{PI}{=} \frac{1}{3}\left(x^3 \ln x - \int x^3 \, d \ln x\right)$$

$$= \frac{1}{3}\left(x^3 \ln x - \int x^{\cancel{3}^{2}} \cdot \frac{1}{\cancel{x}}\,dx\right)$$

$$= \frac{1}{3} x^3 \ln x - \frac{1}{3}\,\frac{x^3}{3} + C$$

$$= \frac{x^3}{9}\left(3 \ln x - 1\right) + C$$

Oef 1 (26)

$$\int \frac{\overbrace{\ln(x+1)}^{= f(x)}}{\underbrace{\sqrt{x+1}}_{g'(x)}}\,dx$$

$$g'(x) = \frac{1}{\sqrt{x+1}} \Rightarrow g(x) = 2\sqrt{x+1}$$

$$= 2\int \ln(x+1) \, d\left(\sqrt{x+1}\right)$$

$$\overset{PI}{=} 2\left[\sqrt{x+1}\,\ln(x+1) - \int \cancel{\sqrt{x+1}}\,\frac{1}{\sqrt{x+1}}\,dx\right]$$

$$= 2\left[\sqrt{x+1}\,\ln(x+1) - 2\sqrt{x+1}\right] + C$$

$$= 2\sqrt{x+1}\left(\ln(x+1) - 2\right) + C$$

Oef 1 (62)

$$\int \frac{\ln\left(\text{tg}\left(e^{-2x}\right)\right)}{\underline{e^{2x}}\,\underline{\cos^2\left(e^{-2x}\right)}}\,\underline{dx}$$

$$u = \text{tg}\left(e^{-2x}\right)$$

$$du = \underline{\frac{1}{\cos^2\left(e^{-2x}\right)}} \cdot \underline{e^{-2x}}\,(-2)\,\underline{dx}$$

$$\frac{dx}{e^{2x}\cos^2\left(e^{-2x}\right)} = -\frac{du}{2}$$

$$= \frac{-1}{2}\int \underbrace{\ln(u)}_{f(u)}\ \underbrace{du}_{g(u)}$$

$$\overset{PI}{=} -\frac{1}{2}\left[u\ln u - \int \cancel{u}\cdot\frac{1}{\cancel{u}}\,du\right]$$

$$= -\frac{1}{2}\left(u\ln u - u\right) + C$$

$$= -\frac{1}{2}\,\text{tg}\left(e^{-2x}\right)\left(\ln\left(\text{tg}\left(e^{-2x}\right)\right) - 1\right) + C$$